NATURAL HERITAGE NEWS

The Newsletter of the Natural Heritage & Endangered Species Program

Inventorying and Protecting the Biological Diversity of the Commonwealth Since 1978

VOLUME 2, NUMBER 1 SPRING 1992

New Endangered Species Regulations In Place

Regulations to implement the new Massachusetts Endangered Species Act (M.G.L. c.131A) were published in the Massachusetts Register on January 31, 1992 and became effective as of that date. The act and regulations afford protection to Massachusetts' rare plants and invertebrate wildlife for the first time and significantly increase the protections for endangered vertebrate species.

The list of Endangered, Threatened, and Special Concern Species, which is part of the regulation, has been reorganized and a few changes were made to the species included on the list (see article on page 6). Species on the rare animal list are placed in taxonomic groupings while species on the rare plant list are now arranged alphabetically by plant family. An

(cont'd on p. 5)

In This Issue...

Decisions Announced for 1992 Small Research Contracts

The variety of efforts to inventory, research, and preserve the state's biodiversity may be appreciated by reviewing this year's small research contracts project list. Twenty-five animal, five natural community, and two plant studies will be funded at a cost of $45,800. Also included in this budget are The Nature Conservancy's contribution of $10,000 towards studies in the Connecticut and Deerfield River Valleys and the National Park Service's funding for studies within Minute Man National Historical Park in Lexington, Concord and adjoining towns.

This will be a particularly strong field season for natural community work in the Commonwealth. One project will map the Pitch Pine/Scrub Oak Barrens of Plymouth County by using aerial photography. Another continues last year's study of old-growth forests in Massachusetts, and a third will address the classification and ranking of Coastal Heathlands and Sandplain Grasslands in Massachusetts. Inventory of priority natural community types of the Connecticut and Deerfield River Valleys will be continued.

A "herptile" (reptile and amphibian) survey of the Connecticut and Deerfield River Valleys will be carried out. Another study will use radio telemetry to track Wood Turtles in western Massachusetts.

Efforts will be made to determine the distribution of Water Shrews and Southern Bog Lemmings in the southeastern part of the state and to survey for the latter species in the Connecticut and Deerfield River Valleys.

Two contracts to study plant species have been approved. One will inventory five rare plants in Essex County and the other will continue a study of Britton's Violet populations in Middlesex County.

Several groups of aquatic insects and their habitats are the subjects of one contract. Several invertebrate research projects will concentrate on beetles. These studies include monitoring populations of Puritan Tiger Beetles and Northeastern Beach Tiger Beetles, with an investigation of the effects of the 1991 hurricane on the latter.

Six animal studies of Fort Devens and its Sudbury Annex will be funded by the Dept. of Defense. These will consist of a study of crustaceans, amphibians and reptiles, an inventory of small mammals, two surveys of rare lepidoptera, and an inventory of tiger beetles. Additional money from the Department of Defense has been authorized to pay for a radiotelemetry study of Blanding's Turtles.

An ambitious project slated for Minute Man National Historical Park is a study of its rare animals and vernal pool wildlife. This study will use radio transmitters attached to salamanders for tracking purposes. Also funded are inventories in the park for natural communities and rare plants, and small mammals.

One Common Tern colony in Boston Harbor will benefit from a pier reconstruction effort. Several projects will continue to be funded to further our understanding of shorebird populations. These include a census of terns and Piping Plovers on the Elizabeth Islands, demographic studies of Roseate Terns on Bird Island, and research on population demographics and the reproductive success of Piping Plovers at 20 sites in Massachusetts.

- Christine Dugan

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Approved by: Philmore Anderson, State Purchasing Agent

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1991 Small Research Contracts Findings

Studies done under the NHESP's 1991 Small Research Contracts program have yielded important information about the state's biodiversity. Some of the project results are abstracted below:

New Species or Sites Found

The NHESP partially funded the publication of findings from Robert Edwards' comprehensive survey of spider diversity on Cape Cod. Among the 465 species he found were several that are new to science, having never been reported there or anywhere else before. This is the first study to give such a complete picture of the variety of spiders on Cape Cod. This diversity is now proven to rival that of many tropical areas.

One dragonfly species, *Stylurus spiniceps*, had been thought to be extirpated (locally extinct) until it was rediscovered along the Connecticut River by Ralph Charlton. He also discovered new populations of three state-listed clubtail dragonflies along the same river.

Hank Gruner and Michael Klemens surveyed the Holyoke Range and discovered new sites for the Marbled Salamander, Four-toed Salamander, Spotted Turtle, and Wood Turtle.

Howard Whidden set up ten trapping sites for Southern Bog Lemmings near the Quabbin Reservoir. He found one new site and verified that a previously identified site is still current.

Natural Community Studies

Several natural community studies surveying the Connecticut River Valley were funded by The Nature Conservancy. These have provided some of our first scientific inventories of communities in the area and have laid important foundations for further studies.

Karen Searcy and Claire Johnson created a database of those plant species occurrences in the Connecticut and Deerfield River watersheds that are indicative of important natural communities. They sorted species by natural community type, county, and town and generated new sites to field check. Their work provides a useful alternative to the usual herbaria arrangement of organizing species in taxonomic order and the general area in which it was found.

Elizabeth Thompson and Jerry Jenkins investigated rare natural communities along the Connecticut and Deerfield River Valleys. They submitted documentation for about 100 sites, including a photographic atlas, plant species lists, and quantitative data for individual communities.

Peter Dunwiddie surveyed 13 old-growth stands, primarily in the Berkshires. He concluded that these stands, which are found only on relatively inaccessible slopes, would have been difficult to farm or to log when the rest of our forests were being cut, and that hemlock is the dominant, sometimes co-dominant, species in most stands. Mixed northern hardwoods, including Sugar Maple and Yellow Birch, were also co-dominant in some stands.

Glenn Motzkin surveyed calcareous fens of western Massachusetts as part of a regional study. His report includes classifications of previously known fens, notes on additional fen communities, and comments on disturbances that could pose threats to the condition of these communities. In a separate study Mr. Motzkin located and inventoried several rare community types of the Connecticut River Valley, including examples of Traprock Ridge, Riverside Wet Meadow, Riverine Grassland and Cobble, and Limey Seepage Swamp communities.

Disappointments

Judith Forsberg was not able to verify reports of Blanding's Turtles in Spencer ... Mark Mello reported a sparse lepidoptera fauna in the fragmented Pine Barrens of Westfield ... Philip Nothnagle found that the numbers of Puritan Tiger Beetles remain precariously low along the Connecticut River and found no other state-listed tiger beetle species ... Dolores Savignano assessed sites with lupine populations, a food source for Karner Blue butterfly larvae, and reported that none of these sites appear to be suitable for this butterfly in the long-term.

-Christine Dugan

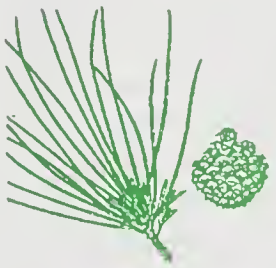
SUMMER 1992 INVENTORY: Observations Requested For:

Wetland Bird Project: This is the second year of a two-year study to research the habitat of wetland birds and to inventory the more secretive ones. Eleven species are being studied: **Pied-billed Grebe, American Bittern, Least Bittern, Green-backed Heron, Virginia Rail, Sora, King Rail, Clapper Rail, Common Moorhen, American Coot, and Common Snipe.** If, during the coming spring and summer, you observe the presence or breeding activities of these birds, please contact Scott Melvin, NHESP Rare Species Zoologist, at (508) 792-7270.

Elderberry Borer Beetle (*Desmocerus palliatus*): We are assessing the status of this long-horned beetle. Adults are seen on the leaves or flowers of elderberry bushes during June and July; eggs are laid on the leaves or stems and larvae bore into the stems of the bushes. We would appreciate written reports on any sightings, including a map detailing the site where individuals were found, and photographs if possible. This species is easily recognized by its dark metallic blue body and the orange-gold color of the anterior portion of its wings. A fact sheet on this beetle is available from our office.

Chaffseed *(Schwalbea americana)*, a plant in the Snapdragon family, is found in moist, sandy soil. It stands one to two feet tall, has yellow-purple flowers, and blooms in late spring and early summer. This plant was last documented in the state in 1963 and is currently being considered for federal listing. If you have noticed this plant, please phone our office or send photographs.

Natural Community Profile: Pitch Pine/Scrub Oak Barrens



PITCH PINE

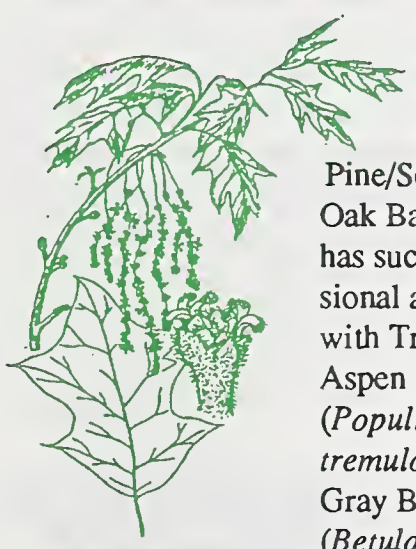
Illustration from Illustrated Flora of the Northeastern United States and Canada by Henry Gleason, Hafner Press, 1952.

Pitch Pine/Scrub Oak Barrens are open shrubland plant communities that occur on well-drained soils often derived from glacial outwash in the coastal plain, the Connecticut River Valley, and other scattered areas throughout the northeast. The sands are acidic, nutrient poor, and drought prone. The dry environment and low humidity contribute to the loss of heat at night, as in a desert.

This community typically has an open canopy of Pitch Pine (*Pinus rigida)* and a nearly impenetrable understory of 7-10 foot tall Scrub Oak (*Quercus ilicifolia*). Areas with tree oaks or abundant pine trees are considered to be woodland or forest, not barrens.

Pitch Pine/Scrub Oak Barrens are a fire-maintained and fire-dependent type of natural community. Species of the community tend to be adapted to occasional light fires: Scrub Oaks and Huckleberries sprout readily from their root crowns and Pitch Pines have thick bark that resists fire damage. Fire increases the rate of nutrient recycling: organic material is slow to rot in the site's dry conditions but releases its nutrients from the ash after a fire. These newly available nutrients result in lush growth of the plants in the first few years, with increased variety of insects that eat the plants, and birds that eat the insects and berries of the plants. Prescribed burns that remove accumulated dead needles and leaves on a regular basis can be used to reduce the danger from wildfires, and help maintain the natural community. Diversity of native species is greatest in recently burned Pitch Pine/Scrub Oak Barrens, and decreases with time after a fire as Scrub Oak regains its dominance.

Pitch Pine/Scrub Oak Barrens are not floristically very diverse; the combination of species plus the physical structure of the vegetation defines the natural community. The main tree species is Pitch Pine. Scrub Oak dominates near the coast and Dwarf Chinquapin Oak (*Q. prinoides*) is more common inland. Huckleberry (*Gaylussacia baccata*) is shorter than the oaks and often grows in dense clones. Lowbush blueberries (*Vaccinium angustifolium* and *V. pallidum*) may form large patches, or grow mixed with other species. In the openings between the shrubs there are usually clones of bearberry (*Arctostaphylos uva-ursi*), large patches of fruticose lichens and intermixed areas with sedges (primarily *Carex pensylvanica* and *C. rugosperma*) or Little Blue-stem grass (*Schizachyrium scoparium*).



SCRUB OAK

Illustration from Illustrated Flora of the Northeastern United States and Canada by Henry Gleason, Hafner Press, 1952.

An inland variant of Pitch Pine/Scrub Oak Barrens has successional areas with Trembling Aspen (*Populus tremuloides*), Gray Birch (*Betula populifolia*), and Black Cherry (*Prunus serotina*). Hairy Wild Lettuce (*Lactuca hirsuta var. sanguinea*), Lion's Foot (*Prenanthes serpentaria*), Broom Crowberry (*Corema conradii*), and Aromatic Boneset (*Eupatorium aromaticum*) are rare plants whose primary habitat is Pine Barrens.

The bird fauna is generally that of oak woodlands: Rufous-sided Towhee, Pine Warbler, Prairie Warbler, and Ruffed Grouse are common. Whip-poor-will and Common Nighthawk now have larger populations in sandy openings of Pine Barrens than in other parts of their increasingly restricted habitat. American Woodcock also use the openings.

BARRENS BUCKMOTH

Lepidoptera are well represented in Pitch Pine/Scrub Oak Barrens. The Barrens Buckmoth (*Hemileuca maia*), a rare moth dependent on Scrub Oak, is threatened throughout its northern range. Several other rare species of moths and butterflies have a particular affinity for Pine Barrens as well. Some of these moths are thought not to exist any longer in Pine Barrens that have been reduced in size to less than a thousand acres. The Karner Blue Butterfly (*Lycaidies melissa samuelis*), which is dependent on large numbers of lupine as its larval food plant, has not been found in Massachusetts for about 100 years.

The Pitch Pine/Scrub Oak community is severely threatened by exclusion of fire and by human development. Despite the large land areas covered by this community type, the flatness of much of the terrain makes it attractive to build on, and the sterile sand substrate with rapid drainage has led to its being regarded as prime buildable land. Many Pitch Pine/Scrub Oak Barrens occur on large aquifers, and development may threaten the quality of the water. Although many acres of these barrens are in state parks, wildlife management areas, and town lands, there are many competing uses of these lands and fire suppression has been almost complete. Few of the areas are managed to maintain this community as it naturally occurs. The careful reintroduction of fire through prescribed burning is currently an experimental management tool for maintaining this community type.

-From a fact sheet by Patricia Swain

Vernal Pool Habitat

Vernal pools are vulnerable throughout the Commonwealth. These pools are usually small and often appear only temporarily in the spring. They are isolated from permanent water bodies, and since they periodically dry up completely, are devoid of fish. While many species of wildlife inhabit these pools for a short time, others spend critical parts of their lives in this environment. In fact, some amphibian species have evolved breeding strategies which rely wholly on these wetlands due to the lack of fish predation on their eggs and larvae.

The Wood Frog (*Rana sylvatica*) and all species of mole salamanders (genus *Ambystoma*) found in Massachusetts breed exclusively in vernal pools. These species annually risk the chance that the pools will dry up before their tadpoles or larvae complete metamorphosis. Many other species of amphibians use vernal pool habitat for breeding and nonbreeding functions, although they are not restricted to this type of wetland. The many types of invertebrates that inhabit vernal pools provide important food for various species of birds, mammals and reptiles, as well as amphibians. Some invertebrates, such as fairy shrimp, spend their entire lives in this unique habitat.

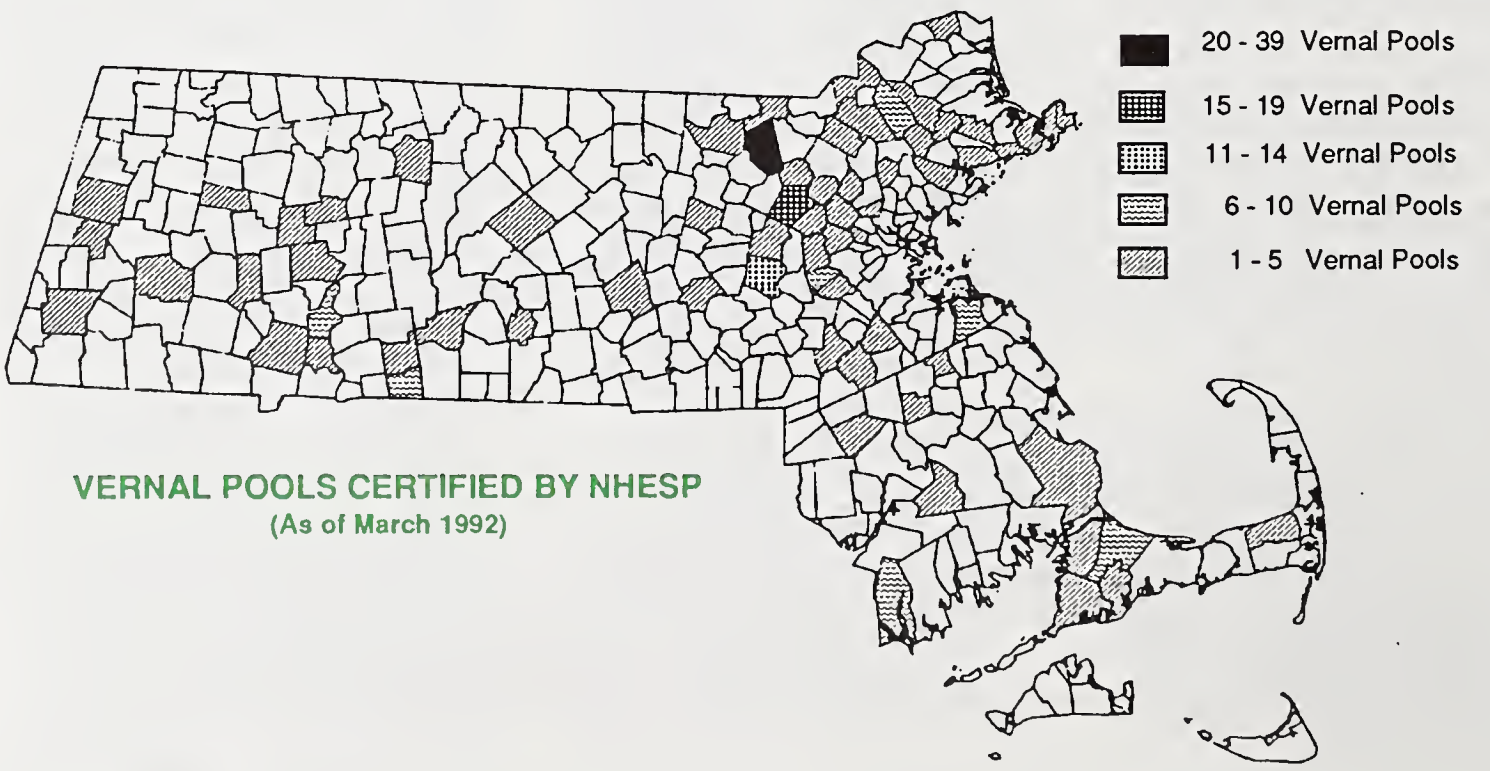
The protection of vernal pool habitat is essential for the continued survival of wildlife species that are dependent upon this unique type of wetland. Destruction or alteration of a vernal pool is likely to have a very significant adverse impact on the local amphibian populations for which the pool serves as a traditional breeding site because few if any of them will be able to find alternative sites. The rate of development in the Commonwealth makes it imperative that vernal pools be certified and mapped in advance in an effort to steer proposed development projects away from these critical habitats.

The revised Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00), which became effective on November 1, 1987, include provisions for the protection of certain vernal pool habitats. Under these regulations vernal pool habitat can be protected if it occurs either within the 100 year inland floodplain or in "Isolated Land Subject to Flooding" (as defined in the regulations at 310 CMR 10.57 (2) (b)). In addition, its existence and location must be certified by the Massachusetts Division of Fisheries and Wildlife. The regulations emphasize that vernal pools are confined basin depressions which contain water for at least two continuous months in the spring and/or summer during most years. The wetlands regulations do not contain provisions for the protection of small upland vernal pool habitat, although the state's Surface Water Quality Standards (314 CMR 4.00) prohibit discharges into any certified vernal pools.

The Natural Heritage and Endangered Species Program does not identify vernal pool habitat, but rather certifies vernal pools identified by others. As of March 1992, the Program has certified 227 vernal pools in 69 towns. Westford, Concord, and Framingham, with 39,18, and 14 vernal pools respectively, lead in numbers of pools certified by the NHESP.

Four elements are required for the certification of vernal pool habitat: biological and physical criteria; field observations; mapping criteria; and presentation of evidence on official forms. Information packages specifying all these requirements are available from the NHESP for anyone interested in having a vernal pool certified.

-Steven Roble



VERNAL POOLS CERTIFIED BY NHESP
(As of March 1992)

Piping Plover Numbers Up

Massachusetts recorded the only substantial increase in Piping Plovers (*Charadrius melodus*) along the Atlantic coast in 1991. Observers reported a total of 160 breeding pairs at 55 sites in Massachusetts and counted 276 chicks fledged. This is by far the largest number of breeding pairs recorded in Massachusetts since comprehensive statewide surveys were begun in 1985.

Breeding pairs are defined as pairs observed with either a nest or unfledged chicks (or that exhibit site tenacity) and evidence of pair bonding and territoriality. Observations in 1991 support the theory that 95% of the adult population of Piping Plovers in Massachusetts form pairs during the nesting season.

The greatest numbers of pairs occurred at Crane Beach (12), Little Beach/Barney's Joy (12), Nauset Spit (8), Coast Guard Beach (7), Cutty Hunk Island (7), Horseneck Beach (7), Parker River National Wildlife Refuge (6), and Great Point, Nantucket (6). Together these 8 sites accounted for 41% of the state's population.

Overall mean productivity for Piping Plovers in Massachusetts was 1.72 chicks fledged per pair, based on estimates of fledging success for 156 of 160 pairs at 54 of 55 sites. A chick was considered fledged if it survived more than 25 days or if it was observed in flight, whichever came first. Productivity estimates (number of chicks per fledged pair) for specific regions were as follows: North Shore (2.21), South Shore (1.0), Upper Cape (1.95), Lower Cape (2.35) Buzzards Bay (1.16), Martha's Vineyard/Elizabeth Islands (1.35), and Nantucket (0.91).

Increases in 1991 abundance and productivity are the result of continued intensive management at many sites. This progress has been made possible through the efforts of numerous individuals, agencies, and conservation organizations that participate in this shorebird conservation effort.

-Scott Melvin

Endangered Species Regulations

(cont'd from p. 1)

index to the scientific and common names of all listed species is a new feature of the regulations.

The habitat protection provisions of the act and regulations become effective after a specific area has been designated as "Significant Habitat". At present there are no areas so designated nor any proposed for designation.

The regulations, which were prepared during 1991 with the assistance of a nine member Technical Advisory Committee, were finalized in December. Over thirty written comments were received on the draft regulations after two public hearings were held in September. Changes made to the public review draft addressed issues raised by commentors, such as providing more public input, and incorporated numerous editorial improvements.

We would like to thank all commentors, members of the advisory committee, and others, especially Craig MacDonnell of Keohane, DeTore and Keegan, who provided invaluable assistance.

Copies of the regulations, 321 CMR 10.00, are available for $3.75 (checks payable to the "Commonwealth of Massachusetts") from:

State Bookstore
State House, Room 116
Boston, MA 02133

-Henry Woolsey

NOTICE TO COLLECTORS

New regulations promulgated under the Endangered Species Act require permits for the scientific collection of plants and invertebrates. Permits for the collection of vertebrates have long been required and continue to be so. Applications are taken at the DFW office in Boston. Please call 617-727-3151 for further information.

NEWFS Starts Seed Bank for Rare Plants

The New England Wild Flower Society (NEWFS) has begun a seed bank program for collecting, storing, and propagating seeds of endangered plants throughout New England. This marks the first attempt by any organization to preserve the region's botanical wealth by means of a seed bank.

Last April the Massachusetts Task Force of the New England Plant Conservation Program drew up a list of 17 species for which seeds would be collected during the program's first year. The NEWFS then managed the collecting, freezing and storage, and propagating processes.

Successful seed storage for six rare species was confirmed by the NEWFS in January 1992. These species are: Downy Wood-mint, White-bracted Thoroughwort, Eastern Silvery Aster, Schweinitz's Sedge, Bicknell's Hawthorn, and Slender Arrowhead.

The complexity of seed bank operations is evident from last year's unsuccessful germination efforts. Seed collection for some plants was problematic because the fruits were not ripe enough when taken and did not respond well to forced ripening and seed release efforts. Others had set seed either earlier or later than expected and so the opportunity to collect had been missed. One selected species occurred on private land and the landowner would not give permission to collect. Still others, properly collected and handled, simply failed to germinate.

The Task Force has selected 13 new species for the 1992 program. The NHESP will direct seed collectors to

appropriate rare plant locations in Massachusetts. Priorities for collection are rare New England species with geographical or ecological uniqueness within a state, or that seem best suited to seed banking procedures, or that are not yet present in the seed bank in optimum numbers.

-Christine Dugan

1992 STATE BOX SCORE

Massachusetts List of Endangered, Threatened and Special Concern Species

(as listed in 321 CMR 10.60, January 31, 1992)

Taxonomic Group	Endangered	Threatened	Special Concern	Listed Total	% of State's Total Native Species That Are Listed
Mammals (including six whales)	**7** *(7 Federal)*	**0**	**5**	**12**	**14%**
Birds (breeding species, except for the Eskimo Curlew)	**11** *(4 Federal)*	**6** *(1 Federal)*	**13**	**30**	**14**
Reptiles (including five sea turtles)	**8** *(4 Federal)*	**5** *(2 Federal)*	**3**	**16**	**53**
Amphibians	**0**	**2**	**4**	**6**	**29**
Fish (inland species only)	**4** *(1 Federal)*	**2**	**3**	**9**	**23**
Invertebrates (non-marine only)	**21** *(2 Federal)*	**16** *(2 Federal)*	**53**	**90**	**N/A**
Vascular Plants	**115** *(3 Federal)*	**81**	**54**	**250**	**14**
TOTALS	**166** *(21 Federal)*	**112** *(5 Federal)*	**135**	**413**	**15***

* Total percentage excludes invertebrates since even a rough number of native invertebrate species in the state is not known.
Federal : Massachusetts species also listed by the U.S. Fish & Wildlife Service as Federally Endangered or Threatened as of Jan. 1992.

Notes on List Changes

Changes proposed last year to the state's List of Endangered, Threatened, and Special Concern Species became effective in January of this year. They are as follows:

Endangered Animals Added to List

The Black Rat Snake *(Elaphe obsoleta)* can reach a length of 72 inches. It is primarily black with a white throat and a checkerboard pattern underneath. An excellent climber, this snake is found in a variety of habitats from steep, rocky terrain to flat areas. Its range is from southwestern New England and Ontario to Georgia, from Wisconsin to Oklahoma, and into northern Louisiana.

Until this year the Taconic Cave Amphipod *(Stygobromus borealis)* was one of eight state-listed crustaceans, all of which were Special Concern species. Since only three individuals of this species have been seen in the state since 1983, its status was upgraded.

Threatened Animals Added to List

The Worm Snake *(Carphophis amoenus)* is 7.5 to 11 inches long and looks much like the common earthworm. It is brown above, pink below, and has a pointed head. It is most often found in moist earth and ranges from southern New England to South Carolina, Georgia, and Alabama.

Plants

Thirteen plant species were added to the list while four were removed. Newly de-listed plants are: Seaside Yarrow *(Achillea millefolium var. lanulosa)*, Northern Water Starwort *(Callitriche anceps)*, Straight-leaved Pondweed *(Potamogeton strictifolius)*, and Autumn Willow (*Salix serissima*). Plants added to the list are:

Endangered Plants Added to List

Nodding Chickweed *(Cerastium nutans)*
Eastern Saline Sedge *(Carex recta)*
Houghton's Flatsedge *(Cyperus houghtonii)*
Few-flowered Spike-sedge *(Eleocharis pauciflora* var. *fernaldii)*
Northeastern Bulrush *(Scirpus ancistrochaetus)*
Wild Senna *(Cassia hebecarpa)*
Small-flowered Agrimony *(Agrimonia parviflora)*
Bicknell's Hawthorn *(Crateagus bicknellii)*
Northern Bedstraw *(Galium boreale)*
Hairy Beardtongue *(Penstemon hirsutus)*

Threatened Plants Added to List

Comb Water-milfoil *(Myriophyllum verticillatum)*
Foxtail Clubmoss *(Lycopodium alopecuroides)*
Rough Panic-grass *(Dichanthelium scabriusculum)*

-Christine Dugan

FUND UPDATE

Contributions to the NHES Fund on 1990 tax forms totalled $347,547. 72,599 donors gave money, with the average donation being $4.79. These contributions account for 84% of our operating budget; the Program receives no tax revenue. These funds can only be used for nongame and endangered wildlife and plant conservation purposes.

Each year various activities are carried out to promote the fund and to alert the public to the work that we do. Perhaps the most media attracting fund promotion activity this year involved bringing a live Bald Eagle to the State House while Gov. Weld pledged to donate to the fund on his income tax return before onlookers, reporters, and photographers. We also provided public service announcements to television stations and placed advertisements on Boston subway cars.

One priority for this year's work will be helping direct fish and wildlife land acquisition projects to protect critical habitats for rare species. We will provide further information on these acquisitions in the next newsletter.

How the Fund has fared:

Tax Year	Amt. Donated	# of Contributors	Avg. Donation
1983	$381,671	101,728	$3.75
1984	287,820	66,290	4.34
1985	261,542	64,607	4.05
1986	419,521	61,009	6.88
1987*	399,708	69,222	5.77
1988	331,095	61,118	5.42
1989	405,989	75,236	5.40
1990	347,547	72,599	4.79

* In 1987, the tax form was changed to allow filers to add to tax owed, not only to deduct from refund due.

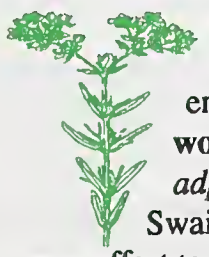
- Christine Dugan

NEWS NOTES

In mid-May **Paul Somers**, botanist with the Tennessee natural heritage program, will start as the **new botanist** with the NHESP. Dr. Somers comes to Massachusetts with 15 years of experience as the Botanist with the Division of Ecological Services in the Tennessee Department of Conservation. His diverse botanical activities in Tennessee include botanical analyses of cedar glade and "grassy bald" plant communities.

❖

Patricia Swain, Program Ecologist, was assisted by volunteers from the Aptucxet Garden Club of Bourne in cutting fast-growing Giant Reed-Grass (*Phragmites australis*) at a pond in Bourne last summer. This exotic (non-native) plant threatens to overtake the state Threatened **Creeping St. John's-wort** (*Hypericum adpressum*) at the site. Dr. Swain believes that the three-year effort to reduce *Phragmites* at this pond has succeeded so well that it will be cut just once a year from now on, instead of the twice per year schedule of past years.



❖

After two years of breeding on Monomoy National Wildlife Refuge, **Grey Seals** returned to their traditional site off Nantucket in early 1992. The recovery of these seals in our waters is partly attributable to the effectiveness of the Marine Mammal Protection Act of 1972.

❖

During the January 10th national eagle monitoring effort coordinated by the National Wildlife Federation 56 **Bald Eagles** and one **Golden Eagle** were counted in Massachusetts. This is an increase over the 1991 survey when 43 Bald Eagles and one Golden Eagle were seen. In general, survey efforts over the past fifteen years have indicated growing numbers of eagles wintering in the state.

- Christine Dugan

PUBLICATIONS

The **Atlas of Estimated Habitats of State-Listed Rare Wetlands Wildlife**, 1992 edition, is now available from our office at a cost of $30.00. Please phone for order forms.

❖

Keys to the Freshwater Macroinvertebrates of Massachusetts by Douglas Smith has recently been privately printed. To order a copy, please send a check for $17.00 (payable to Douglas Smith) to: Douglas Smith, Dept. of Zoology, University of Massachusetts, Amherst, MA 01003-0027. (Massachusetts residents should add 85 cents sales tax.)

❖

The National Wildlife Federation has produced education packets for teachers on nationally and internationally endangered species. The packages are available from our office, from the DFW in Westboro, and from DFW district offices across the state.

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Division of Fisheries & Wildlife
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Boston, MA 02202

Save something on your taxes.

Contributions to the NHES Fund are usually made on state income tax forms and are deductible on federal tax forms.

☐ Or, you can donate directly to the Fund with a personal check. Please accept my contribution of $_____ . *Please make checks payable to "Natural Heritage & Endangered Species Fund".*

Rare Names for Rare Animals

Many people think primarily of large or showy animals, such as Bald Eagles or whales, when they think of rare animals in the state. In fact, the majority of our protected animals belong to much less appreciated groups such as reptiles, amphibians, and invertebrates. Of our 163 state-listed* rare animals, only 30 are birds and 12 are mammals.

Four of these lesser-known listed* species, with particularly unusual names, are briefly described below:

The Endangered **Taconic Cave Amphipod** is a small (about 1/6 " long), subterranean crustacean that looks like a miniature shrimp but has no eyes. Various theories place the evolution of this species anywhere from 2 million to 14,000 years ago; perhaps it survived underground during the last glaciation. This invertebrate lives in underground water systems and feeds on dead organic material. It has been documented at only one site in Massachusetts (in limey water in Berkshire County) and at a total of three sites in the world.

A Special Concern species, the **River Moss Animal** is also known as **Carter's Moss Animal.** It is a minute invertebrate that filter feeds on dead and living organic matter using an arrangement of tiny tentacles. Ten to twenty individuals join to form colonies that are about one-half inch in size and that are attached to a variety of substrates, including the shells of dead mussels, submerged logs, and the undersides of rocks. Colonies are often found grouped together and appear as translucent, gelatinous mats that look much like the egg masses of salamanders. In Massachusetts, this species has been found only along the Connecticut River in the Deerfield area.

The Special Concern species called the **Tidewater Mucket** is a freshwater mussel with a coppery, pinkish shell and teeth along its hinge line. In Massachusetts, it is found only in Plymouth and Barnstable Counties. Like other muckets, it is a long-term breeder: fertilized eggs are retained in gills of females during the summer, developing into larvae that are released the following spring. The larvae parasitize fish until they metamorphose into their juvenile form and then drop off their hosts.

The **Small-footed Myotis** is a Special Concern species. It never reaches a length of more than two inches, making it the smallest bat in the eastern United States. It has golden fur that is almost yellow, a black facial mask and black ears, and lives on a diet of insects. This mammal finds shelter in buildings during the summer and in caves and mines in winter. It has only been seen twice in the state since 1978, both times in Hampden County.

- Christine Dugan

*Endangered, Threatened, or Special Concern Species

NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM
DIVISION OF FISHERIES & WILDLIFE
100 CAMBRIDGE STREET
BOSTON, MA 02202

NATURAL HERITAGE NEWS

The Newsletter of the Natural Heritage & Endangered Species Program

Inventorying and Protecting the Biological Diversity of the Commonwealth Since 1978

VOLUME 2, NUMBER 2 FALL 1992

More than 432 acres have been acquired in 1992 by the Division of Fisheries and Wildlife to protect rare species and exemplary natural communities, the goal of the Natural Heritage & Endangered Species Program (NHESP). Through the inventory work of NHESP, funded by voluntary contributions on state tax forms, Fish & Wildlife was able to identify which land was important to purchase for conservation purposes. (The land purchases themselves were financed through bond funds, not donations.) Five of the acquired parcels are adjacent to or surrounded by other conservation land, further buffering them from nearby land uses and possible residential and commercial development. Three of the transactions were negotiated by The Nature Conservancy (TNC) on behalf of the Commonwealth. The Division now owns 1210 acres of habitat purchased for the protection of rare species and exemplary natural communities.

Sally Carroll

Town	Acreage	Significance of Site Purchased
Stockbridge	70.0	Best calcareous basin fen in the state. 1,3,4,5
Hinsdale	10.8	Sloping calcareous seepage swamp. 1,3
West Stockbridge	118.0	Excellent example of rich mesic hardwoods. 1
Leverett	10.8	Private inholding in rich mesic hardwoods conservation area. 2
Westfield	195.18 (2 tracts)	Excellent amphibian breeding site with some of the highest diversity in abundance in the state.
Sunderland	6.0	Riverine cobble islands.
Plymouth	21.0	Pristine example of globally rare coastal plain pond community. 5
Edgartown	0.25	Small, private inholding in excellent sandplain grassland conservation area. 2,5

1 Adjacent to conservation land
2 Surrounded by conservation land
3 See story on page 3
4 See story on page 4
5 Negotiated by TNC

In This Issue...

Radiotelemetry: Tuning In To Turtles

BLANDING'S TURTLE

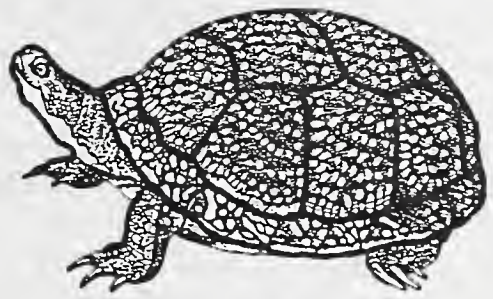

Illustration from Amphibians and Reptiles of New England by DeGraaf, 1983.

The decline of reptiles and amphibians has become a global problem due in part to their vulnerability to habitat fragmentation; yet, there has been little research into this area. This year, three studies funded through NHESP's 1992 Small Research Contracts program used the technology of radiotelemetry to learn about the dispersal and movement patterns of theSpotted Salamander, Blanding's Turtle, and Wood Turtle. Radiotelemetry is the use of audible signals transmitted through electromagnetic waves from a device, in this case, attached to the animals being tracked. The tracker carries a receiver that produces a beeping sound when it receives an animal's signal; the closer the animal, the louder the sound.

(Continued on next page)

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Approved by: Philmore Anderson, State Purchasing Agent

Massachusetts Division of Fisheries and Wildlife
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Radiotelemetry

(continued from page 1)

To increase turtle populations, it is important for wildlife managers to know which habitat types turtles rely on for feeding and nesting. In an attempt to discover where Blanding's Turtles *(Emydoidea blandingii)* nest at Fort Devens, independent biologist Brian Butler radio-tracked Blanding's Turtles at the 9,000-acre army base in Lancaster for a study funded by the U.S. Department of Defense. These turtles like to nest in areas with open, sparsely vegetated, sandy soil, which is abundant at the base. It is often difficult to locate the exact site(s) they use for egg-laying because these turtles have a large home range that stretches along a river course.

In early June, Brian bolted or glued 2-by-1/2 inch radio transmitters and 8-inch wire antennas to the shells of ten females and two males. The adventuresome turtles provided Brian with constant challenges. Four of the monitored turtles decided to nest behind Fort Devens' firing ranges, which kept Brian away during target practice! Working long (sometimes 15-hour) days on his feet to radio-track the turtles, Brian discovered that they travel far and for long periods. Also, while each turtle's transmitter signal can ideally carry up to a mile, it's range shrinks to about a quarter-mile when a turtle is surrounded by hills, thick vegetation, or deep water, making tracking a little more tricky.

One turtle went over a mile away to nest, and remained there 4-5 days before returning. Three turtles were known to cross the river; one turtle left the base for a vernal (seasonal) pool off the property and stayed there 3 to 4 weeks. Turtles may make such visits to feast on the wood frog tadpoles and other amphibians that inhabit the warmer waters of vernal pools.

Brian will eventually plot all the turtles' movements on a large-scale composite map. As the transmitters are expected to stay on the turtles for a couple of years, Brian hopes to continue the study next year to determine where the turtles choose to hibernate.

SPOTTED SALAMANDER

Illustration from The Salamanders of New York by Bishop, 1941.

Bryan Windmiller, a doctoral student at Tufts University, used transmitters the size of kidney beans to track 17 Spotted Salamanders (*Ambystoma maculatum*). This ongoing project at Minute Man National Historical Park in Lexington and Concord, funded through **NHESP** primarily by the National Park Service, used radiotelemetry to study the dispersal patterns of salamanders and their susceptibility to changes in their habitat. The transmitters were sewn onto small bandages and then sutured onto each salamander's skin while it was under anesthesia. These salamanders, which range from 5 to 8 inches (females are larger), could only be tracked for about 3 weeks because the transmitters came off when they shed their skins. Preliminary results of the study show that the tracked salamanders almost exclusively inhabited the burrows of small mammals, mainly short-tail shrews, which are usually under or near logs. Most Spotted Salamanders seem to head straight from the study pond towards the area with the highest density of shrew burrows. Through radiotelemetry, Bryan also found that the salamanders spent most of their time less than 6 inches under the surface of the soil, and rarely surfaced during the day. Bryan's management recommendation for Spotted Salamander would be to leave the forest floor messy! Short-tail shrews like leaf litter and lots of logs, and what's good for shrews may be good for Spotted Salamanders.

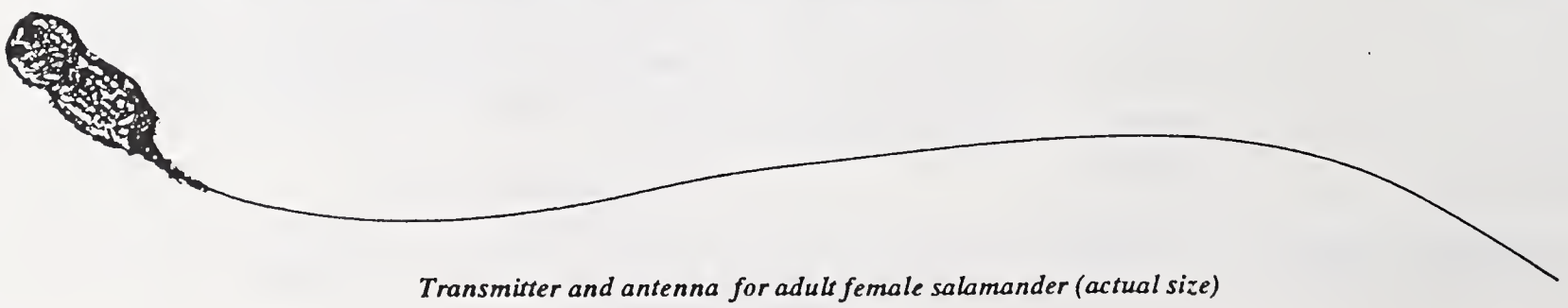
WOOD TURTLE

Under a small research contract funded by monies made available to NHESP by The Nature Conservancy, Dr. Philip Robakiewicz of the Mass. Audubon Society is studying the habitat preferences of Wood Turtles (*Clemmys insculpta)* in the Scantic River floodplain area of Wilbraham, Hampden, and Monson. Phil's study got off to a late start after he and his volunteers took 6 weeks and 250 search hours to find 5 Wood Turtles. A total of 3 female and 2 male turtles, each at least 15 years old, were fitted with transmitters and tracked twice weekly, at which time a vegetation analysis was done of their surrounding habitat.

Phil found that, like Blanding's Turtles, the Wood Turtles moved long distances and, as summer progressed, they moved farther away from water into dry oak woods. No nesting turtles were found, probably because the study started late and the egg-laying season (May-June) had ended. However, radiotelemetry allows Phil the option to "tune in" to the turtles again next spring.

This year, Phil's study focused on the habitat choices of Wood Turtles. He speculates that one reason the turtles travel to certain areas is the seasonal abundance of food plants at those locations; he is thankful that instead of taking hours to find these turtles using conventional methods, he can locate a "wired" turtle in 45 minutes using radiotelemetry.

- Sally Carroll



Transmitter and antenna for adult female salamander (actual size)

Natural Community Profile: Calcareous Fen

Description

Some of New England's best calcareous fens are in Massachusetts. They provide habitat for many state-listed rare species of plants and animals, making them an important contributor to the state's biological diversity. They are open, peaty wetlands with cold, alkaline groundwater that flows through an underground mineral layer containing calcium carbonate. These calcareous fens support a variety of plants dominated by calciphile (lime-loving plants) species of sedges, grasses, broad-leaved herbs, and shrubs. Calcareous fens are inhabited by predominantly northern or midwestern plants that persist or outcompete southern species in the fen. (For more information on this community, a fact sheet is available from NHESP.) They also provide habitat for the Bog Turtle (*Clemmys muhlenbergii*), which is listed as Endangered in this state and has a restricted global range.

The calcareous fen is not classified as a bog, because of its continual water movement that transports dissolved calcium and magnesium and flushes out tannins and acids, and prevents the deeper peat accumulations characteristic of the acidic conditions of bogs.

Geology, Climate, and Origins

Calcareous fens in Massachusetts are small communities, mostly a few acres or less, that are found scattered through the limestone region in Berkshire County. They occupy low-lying basins or bottom slopes that intercept the flow of water draining from marble, dolomite, or magnesium limestone rock. Porous gravels facilitate groundwater flow and often occur at calcareous fens, at their discharge sites. These gravels date back to the Pleistocene period, when glaciation left behind sorted gravel and sand in ridges, deltas and terraces deposited by meltwater streams in valleys of ancient rivers.

Generally, calcareous fens are considered an early stage of a sequence that begins with open water and progresses by gradual changes in habitat to a forest climax, a process known as succession. This process creates noticeable zones or patterns along the water level gradients where distinctive plant communities coexist. Superimposed on this is a topography of hummocks and hollows reflecting further unevenness in the distribution of peat and water and often leading to mosaic patterns of vegetation. The extremely wet portions (when present) are dominated by a variety of sedges and grasses. Basin or Level Calcareous Fens are large in size and originated as lakes now being filled in with slow-draining thick peat mats; Seepage Calcareous Fens typically have open channels of faster-moving water and thin or non-existent peat mat; and Sloping or Hillside Calcareous Fens are an intermediate form influenced by a stream that occasionally floods, bringing increased sediments and nutrients, and consequently a reduced peat mat. A complete classification of calcareous fens is being conducted by Glenn Motzkin under a research contract funded by NHESP and The Nature Conservancy; this includes studies of fens in adjacent areas of Connecticut and New York.

Protection Status

Most calcareous fens in Massachusetts have been influenced by human activity through the disturbance of the peat layer and/or water supply. A number of factors can either disrupt or maintain the checks and balances that stabilize calcareous fens over a long period of time, such as changes in the nutrients, water chemistry and water levels. Flooding and ditching, when they result in severe or prolonged water level changes, either reverse or speed up the natural processes in community succession; grazing may slow succession and appears to increase plant diversity of some fen communities, but its potential to increase nutrients and compact soils can often have negative effects, such as the decrease, absence or replacement of calciphiles by aggressive wetland species such as Giant Reed (*Phragmites australis*). Increased nutrient levels (primarily nitrogen) can also locally alter the balance of the flora by favoring escaped garden plants like Purple Loosestrife (*Lythrum salicaria*). Moderately disturbed or degraded calcareous fens still have the potential for some recovery. Others actually appear to require or benefit from intervention by controlled or specific disturbances. A few small and marginal calcareous fens in Massachusetts owe their diversity to light grazing or mowing.

Probably the greatest threat to calcareous fens is the change in quantity or quality of the groundwater originating from other areas within the watershed. In light of the few high-quality fens remaining, and their location in an area of accelerated growth and development (Berkshire County), they are among the five most threatened types of natural communities in the state.

Illustration by Virginia Salzman

- Adapted from a fact sheet by Virginia Salzman

Britton's Violet ..... Or Not?

Viola brittoniana v. brittoniana

Viola brittoniana v. pectinata

Britton's Violet *(Viola brittoniana)* is a perennial herb that occurs in open floodplain woods and river meadows that are subject to occasional flooding. It is listed as Threatened in Massachusetts, as there are only 6 known populations of this plant which occur along the Concord River.

The two plants pictured above have been classified by botanists as varieties of the same species although they look markedly different. Variety (v.) *brittoniana* has deeply lobed leaves, whereas the leaves of v. *pectinata* are unlobed and have comb-like teeth along the basal margins. The two plants may have originally been classified as similar because their flowers and overall ranges are similar.

Dr. Richard Kesseli, a geneticist at UMass Boston, is convinced that, although quite similar, the two violet varieties are distinct from one another. He and his student, Valerie Stone, are using nuclear DNA analysis by gel electrophoresis to determine the genetic differences between the two taxa. The process involves separating DNA and protein from the plants and spotting them onto gel, so that they can be studied and compared. Through this method, Kesseli and Stone have identified several genetic markers that may have resulted from many generations of genetic selection before v. *pectinata* lost some leaf and other characteristics of v. *brittoniana*.

Viola brittoniana v. *pectinata* may be a hybrid of Britton's Violet and another stemless blue violet, which Kesseli and Stone hope to identify through further research. Such hybrids are rare in nature and are generally not recognized as being taxonomically different from the parental species.

As v. *pectinata* is only known from one population in Norfolk County, if it is considered a separate species from *Viola brittoniana* it is even more rare than previously thought, and might be proposed as a federally listed species. Stay tuned for updates on Britton's Violet in future issues.

- Sally Carroll

Protecting Kampoosa Fen

We are pleased to report an environmental success story. We review hundreds of development projects a year, and it is nice to be able to show how the process can work. This particular environmental review involved Kampoosa Fen in Stockbridge. Kampoosa Fen supports one of the greatest concentrations of rare species in Massachusetts, and is one of the best examples of a calcareous basin fen natural community in New England; there are conservation restrictions over much of the area. The "lifeblood" of the fen is the alkaline water which flows in with crucial minerals and nutrients, and should be free from sources of degradation.

Tennessee Gas Pipeline Company owns a right-of-way with a pipeline running through part of Kampoosa Fen. The physical disturbance resulting from the construction of the original pipeline facilitated the growth of Giant Reed Grass *(Phragmites australis)*, a six-foot tall, invasive plant that crowds out other vegetation, which grew on Tennessee Gas Company's right-of-way along with two rare plant species, Pendulous Bulrush and Fringed Gentian. In 1989, Tennessee Gas Pipeline Co. proposed to construct a second pipeline, more than 10 miles long, going through Richmond and Stockbridge; it would pass under the Massachusetts Turnpike and through the Kampoosa Fen. In May 1991, In response to the request, **NHESP** recommended that the new pipe be placed along the northern margin of the fen, situated further upland. In this location, the pipe would bypass the fen as much as possible, and cross fewer streams and wetlands than in the originally proposed location, where NHESP was also concerned that noise from construction would disturb rare birds nesting in the fen such as the American Bittern, and the 15 state-listed rare plant species there. NHESP also stated that, if a second pipeline was to be added, it should be with the stipulation that existing damage to vegetation by *Phragmites* should be remediated as much as possible, and minimal new damage done.

To its credit, Tennessee Gas agreed to take the least damaging, most northerly route for its second pipeline, and has entered into an agreement with The Nature Conservancy to have the area cleared of *Phragmites* with regular mowing and herbicidal treatment, and to prevent its spread into the fen. Construction of the second pipeline will probably begin next fall to avoid construction during spring and summer, which is the animals' breeding season.

NHESP Environmental Reviewer Jay Copeland handled this project review. Jay worked with Stone & Webster, an engineering firm in Boston, to refine their mitigation measures. Their cooperation helped the review process go very smoothly, and show promising results.

- Sally Carroll

Advisory Committee holds 100th Meeting

The Division of Fisheries & Wildlife's Nongame Advisory Committee recently held its 100th meeting since its official establishment in 1983. This committee was created by the law that added the contribution line for nongame wildlife conservation to state income tax forms. The committee has been quietly and effectively going about its business ever since performing annual tasks such as reviewing Small Research Contract proposals or changes to the state's rare species list as well as taking on complex issues such as assessing the threats posed to native species and communities by exotic plant and animal species. NHESP greatly appreciates the tireless efforts of committee members who are generous with their time, ideas, and constructive advice.

The Committee meets on the second Thursday afternoon of each month (except August) at the Division's Field Headquarters in Westboro at 1:30 PM. Dr. Gwil Jones of Northeastern University's Biology Department is the chairman. For a complete list of committee members and associate members, please see the last page of this newsletter. The public is welcome at these meetings.

The Committee's schedule of annual agenda items is as follows:

January - Review previous year's Small Research Contract results;
February - Review current year's Small Research Contract proposals;
March - Review NHESP budget;
April - Review proposed changes to the state endangered species list;
May - Review NHES Fund promotional campaign;
June - Discussion of final recommendations for endangered species list changes;
September - Review of previous fiscal year's activities of NHESP;
December - Election of Advisory Committee Officers.

- Henry Woolsey

Returning grasslands to Martha's Vineyard State Forest

The winds of Hurricane Bob in August 1991 and the subsequent storm on Halloween have long since disappeared but the storms' repercussions are still being felt on Martha's Vineyard. These storms caused significant damage to many of the forest plantations of the Manuel F. Correllus State Forest that occupies 4300 acres in the center of the island. NHESP is a member of a committee that has been formed by the Department of Environmental Management's Division of Forests & Parks (DEM) to assess fire hazards within the forest and to reevaluate the property's ecological resources.

Property History

The property was acquired originally by the Commonwealth in the early years of this century to help protect the Heath Hen, a relative of prairie chickens, which had become entirely restricted to Martha's Vineyard by the end of the nineteenth century. After the Heath Hen became extinct in the early 1930s the state began planting a variety of pine species in what had previously been the Heath Hen's open grassland and heathland habitat. Many of the pine plantations have not fared well due to disease and other factors. The recent wind storms compounded the situation.

A Fire Hazard

Most of the vegetation of the state forest is quite flammable and the area has a long history of wild fires. Because of the additional potential fire hazard posed by the trees that had been blown down, DEM has been assessing the different vegetation types as potential "fuels" and has been rapidly moving ahead to widen existing fire breaks to be better able to control possible wild fires or to conduct prescribed burns which would reduce woody fuels and thus the fire danger.

Rare Species

Fifteen species that are presently listed as Endangered, Threatened or of Special Concern in Massachusetts have been recorded from this state forest as follows:

	current	historical
butterflies	-	1
moths	3	-
birds	-	1
plants	8	2

Most of the rare species recorded from the forest occur in grassland/heathland habitats which have declined markedly during this century, both in the forest and on the island. A few of the listed species are inhabitants of pitch pine/scrub oak barrens.

Grasslands

As a means to help control wildfires, to create an important wildlife habitat, and to recreate vegetative communities that formerly occurred within the state forest, DEM is developing a plan that would convert up to a thousand acres of pine plantations or oak woods back into grasslands and perhaps another thousand acres into a savanna habitat. The potential for managing habitat within the state forest for state listed rare species and other uncommon species represents a very exciting opportunity for wildlife conservation in Massachusetts.

Task at hand

DEM is working with a variety of individuals and organizations to further develop and implement this ambitious but most worthwhile plan. Groups helping DEM in this endeavor include: the NHESP, The Nature Conservancy, Massachusetts Audubon Society, The Trustees of Reservations, the U.S. Fish & Wildlife Service, the U.S. Forest Service, the Cape Cod National Seashore, the Department of Forestry & Wildlife Management at the University of Massachusetts at Amherst, and the Nantucket Conservation Foundation. For more information individuals can contact Bill Rivers at DEM, (413) 545-5993.

- Henry Woolsey

FUND UPDATE

As close readers of this newsletter are no doubt aware, **eighty-four percent of the Program's operating budget comes from tax form contributions.** However, contributions to the Natural Heritage & Endangered Species Fund on state income tax forms have declined for two consecutive years and 1991 figures appear to continue this trend. The present tabulation of contributions on 1991 tax forms, although still incomplete, shows a total $301,451. Contributions declined 14% in 1990 and final 1991 figures are expected to show an additional decline of 8 percent. These declines are thought to be due to general economic factors as well as competing "checkoffs" on the tax forms.

In an effort to augment our declining revenues, **NHESP** has been successful in obtaining money from various organizations and federal agencies for the following variety of projects:

Department of Defense
*Blanding's Turtle Study, Fort Devens
*Wildlife inventories, Fort Devens
*Flora of Camp Edwards
National Park Service
*Biological inventories, Minute Man National Historical Park
Fish & Wildlife Service
*Research and management on federally listed species
*Wetland bird research
*Data for study of potential Conte National Wildlife Refuge
Environmental Protection Agency
*Wetland bird research
Forest Service/Dept. of Env. Mgmt.
*Review Forest Stewardship plans and preparation of species atlas
The Nature Conservancy
*Biological inventories, Connecticut River.

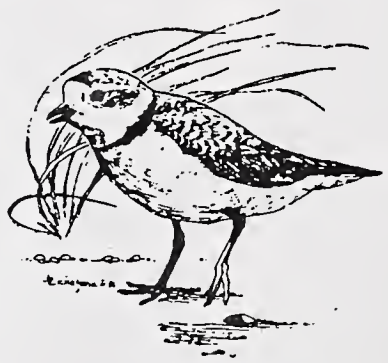
These grants total about $200,000, spread over several years.

- Henry Woolsey

Plover Numbers Reach All-Time High

This year brought exciting news for the threatened Piping Plover! The number of nesting Plovers in Massachusetts increased to 213 pairs, the highest number ever documented in the state, reports Dr. Scott Melvin of NHESP. This number of breeding pairs increased from 160 and 140 pairs in 1991 and 1990, respectively. Average statewide productivity increased to 2.0 chicks fledged per pair, compared to 1.7 and 1.4 in the previous 2 years.

The Piping Plover is a small, grey and light-brown shorebird that nests on sandy coastal beaches. Its numbers have been declining over the last 50 years partly because of human intrusion into its coastal habitat and from predation by growing numbers of raccoons and other animals that thrive in residential areas.



The recent population increases of plovers are attributed to intensive management designed to protect habitat and enhance productivity. Management included use of wire fencing to protect nests from predators such as foxes, skunks, crows, and gulls. Twine fencing and warning signs were used to protect nests from pedestrian disturbance and provide refuge areas for chicks. Temporary closures to off-road vehicles at several beaches protected flightless chicks from being run over.

Protection from vehicles was too little and too late for a chick that was run over and killed by a vehicle on East Beach on Chappaquiddick Island on June 24. Biologists that were stationed on the beach during daylight hours to guide vehicles past the lone chick lost track of it for only 15 minutes, during which time it was run over and killed. Such incidents demonstrate how vulnerable plover chicks may be to mortality caused by motorized vehicles on beaches.

On Cape Cod, Piping Plovers showed positive responses where portions of beaches were closed temporarily to recreational off-road vehicles to protect newly hatched chicks. Numbers of plovers increased from 15 to 28 pairs on the North District of the Cape Cod National Seashore, from 8 to 14 pairs at Nauset Spit in Orleans, and from 5 to 10 pairs at Sandy Neck in Barnstable. Plovers at all three areas fledged an average of greater than 2 chicks per pair, which indicates excellent productivity.

Only 6 pairs nested along the South Shore in Scituate, Duxbury, and Plymouth, but in these towns productivity again averaged above 2 chicks fledged per pair, which bodes well for the future. "The population on the South Shore has declined to such a low level that it will likely take several years to rebound" said Dr. Melvin. On Plymouth Beach, the pair of plovers that nested this year moved their newly hatched chicks onto sections of beach that had been closed to off-road vehicles only days before, and remained in those areas for several weeks until the chicks fledged.

Censuses and protection efforts for Piping Plovers are carried out by wildlife biologists and beach managers working for state and federal agencies, private conservation organizations, and towns, and by university researchers. Much of this work is coordinated by the Massachusetts Division of Fisheries and Wildlife, and is funded in part through voluntary contributions to Massachusetts' Natural Heritage and Endangered Species Fund. Despite increases in its population, the state's Piping Plover continues to face threats in other parts of its range both in and outside Massachusetts. Its growing success highlights the bird's dependence on our continued management and protection for its survival.

- Adapted from a press release by Scott Melvin.

NEWS NOTES

EAGLE COUNT

A total of 7 pairs of Bald Eagles nested this year in the state; 5 pairs laid eggs, and 7 chicks fledged this summer, including one that was raised in captivity and then "fostered" into a wild nest.

❖

BURYING BEETLES CHILL OUT

Illustration from The Common Insects of North America by Swan & Papp, 1972.

Perhaps due to an unseasonably cool survey period this year, only two American Burying Beetles (*Nicrophorus americanus*) were captured on Penikese Island in Buzzards Bay. In 1991, 16 were captured during the July 1-4 survey period when the temperature stayed above 59 degrees Fahrenheit. A total of 89 of these lab-reared beetles have been released on the island through the 1992 field season as part of an attempt to reintroduce this once-thriving species to this state. Burying beetles are so named because they bury the corpses of small animals before using them as food for their offspring.

NEWS NOTES

REARING REGAL FRITILLARIES

In a cooperative project between NHESP, UMass Amherst, UConn., and many other public and private parties, the Regal Fritillary butterfly will be studied to discover why its population has declined. Unfortunately, no Regal Fritillaries were found in Massachusetts or anywhere else in New England this year. Four female Fritillaries from Pennsylvania, the nearest known colony, were taken to Massachusetts to be captive-reared. From the 4,000 eggs laid so far could come several hundred viable pupae, some of which may in future be released into suitable habitat in Massachusetts.

❖

PEREGRINES' PROGRESS

A Peregrine chick we released in Boston in 1990 is nesting at Throg's Neck Bridge in New York with her mate, also from Boston; we released him in our 1984 pilot program. A record high of 6 Peregrine chicks were counted this year: 4 fledged in Boston and 2 in Springfield, the sites of our two known Peregrine nests. There were 5 males and 1 female.

PUBLICATIONS

Henry Woolsey, Coordinator of NHESP, has co-authored a book entitled the New Massachusetts Endangered Species Act published by Massachusetts Continuing Legal Education, Inc. (MCLE), a non-profit educational institution. While not everyone may want to purchase this $60 softcover, it might be a worthwhile investment for those who want a greater understanding of the legal impact of the Massachusetts Endangered Species Act (MESA). The book explains the Act and regulations; species taking issues; and analyzes case decisions on whether land use regulations constitute a regulatory "taking" without compensation. The book includes the complete MESA and regulations. Anyone interested in the book may call MCLE at 1-800-632-8077.

❖

James Cardoza, Gwilym Jones, Thomas French, and David Halliwell have produced a booklet entitled A Compilation of the History and Status of Exotic Vertebrates in Massachusetts. This is Number 6 in the Division of Fisheries & Wildlife's series entitled Fauna of Massachusetts. Information on obtaining this booklet is available by calling the DFW's Westboro office at (508) 792-7270.

- Sally Carroll

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Staff Changes

Paul Somers joined us in May as the new State Botanist. Paul received his master's degree in botany from the University of Maine and his Ph.D. in plant systematics from the University of Tennessee. He has 15 years of experience directing the Rare Plant Protection Program in the Tennessee Department of Conservation's Natural Heritage Program, one of the oldest heritage programs in the country. Paul received the Tennessee Governor's Environmental Achievement Award in 1990. He has published more than 25 articles and reports; his work has appeared in *The Tennessee Conservationist, Cumberland Journal*, and the *Journal of Tennessee Academy of Sciences*. We look forward to his contributions in inventorying, researching, and protecting Massachusetts' flora.

Steve Roble left the Program this spring to take the position of Chief Zoologist of the Virginia Natural Heritage Program in Richmond. Steve joined **NHESP** in January 1988 and made important contributions to the Program's environmental review operations and biological data base. He drafted the "Guidelines for the Certification of Vernal Pool Habitat" and subsequently certified more than 200 vernal pools. He greatly improved the Program's invertebrate (dragonflies in particular) and herpetological data base. An excellent field biologist, he tirelessly responded to approximately 400 Wetlands Protection Act regulatory filings a year that potentially impacted rare wildlife. We wish him lots of success, and field work, in Virginia.

While Environmental Reviewer **Jay Copeland** is on a leave of absence to care for his infant daughter, Molly, his assistant **Patricia Huckery** is the Acting Environmental Reviewer until the winter of 1993. Pat was Environmental Review Intern at NHESP while completing her Master's degree in Environmental Studies at UMass-Lowell.

Jay wasn't the only one to become a father--congratulations also go out to our Assistant Director **Tom French** on the birth of his daughter, Alexandra, on May 24th. And speaking of babies, our former newsletter intern **Chris Dugan** is now taking care of her son, Zachary, who was born on July 24th, before his deadline. Chris also raised the *Natural Heritage News* from its infancy these past two years; we thank her for cheerfully pioneering the format and layout of the newsletter, and we will miss her. A former data intern, I have assumed production of this newsletter.

- Sally Carroll

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